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(54) PROCESS FOR THE IMPREGNATION OF GLASS FIBRE MATERIALS

(71) We, VEB KOMBINAT TECHNISCHES GLAS ILMENAU, of 17 Wellerswalder Weg, 726 Oschatz. Germany, a corporation organised under the laws of Eastern Germany, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention is concerned with a process for the impregnation of inorganic fibre materals, such as glass fibre materials, especially of fabrics made from glass fibres, half silks and silks.

Processes are known in which the glass fibre materials are either treated with organo-silicon resins or with dispersions of fluoropolymers, preferably with polytetrafluoroethylene. With these known processes, there are achieved, in some cases, either good tensile strengths in a dry and wet state, whereas the long-term bending strength does not meet the required values, or the long-term strength has optimum values but the tensile strength only achieves low values in a wet state.

Processes are also known in which the glass fibre materials are subjected to, for example, a treatment with silicones. However, the purpose of these processes is only to increase the tensile strength in a wet state.

Furthermore, a process is known for increasing the wet strength of glass fibre materials. This process consists essentially in a particular heat treatment of the glass fibre materials and is suitable, in particular, for glass fibres with an alkali content of less than 3%, in order to achieve a considerable increase of the wet strength.

In addition, processes are also known in which the glass fibre materials are treated with polytetrafluoroethylene. With these known processes, the main object is to improve the abrasion properties. However, it is also known that, by the addition of graphite, the long-term resistance to elevated temperatures can also be increased.

Furthermore, a process is known for the impregnation of glass fibre materials, for the optimum increasing of the mechanical properties, with a composition containing silicone resins and fluoropolymers or containing silicon resins and molybdenum disulphide and/or graphite and subsequent fixing at an elevated temperature. The compositions containing silicone resin and fluoropolymer can also contain molybdenum disulphide and/or graphite. As silicone resins, there are used, for example, methyl, phenyl, methyl-phenyl silicone resins or mixtures thereof. As fluoropolymers there can be used, for example, polytetrafluoroethylene, fluoroalkylalkoxy-silanes, fluoro-elastomers or fluorochloro-polymers.

However, in the case of this process, the flexibility of the impregnated glass fibre materials cannot be varied as desired.

The problem forming the basis of the present invention is to provide a process in which the flexibility of the impregnated glass fibre materials, as well as of mixtures of glass fibre materials with organic fibre materials, can be varied as desired.

According to the present invention, this problem is solved by using as silicone resins, mixtures of cross-linked silicone compounds, i.e. so-called silicone resins, with linear, non-cross-linked silicone compounds, preferably silicone oils or liquid silane derivatives.

Thus, according to the present invention, there is provided a process for the impregnation of inorganic fibre materials, such as glass fibre materials, with a composition containing silicone resins and fluoropolymers and optionally graphite and/or molybdenum disulphide or with a composition containing silicone resins and graphite and/or molybdenum disulphide, which composi-

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tions are fixed at an elevated temperature, wherein, as silicone resins, there are used mixtures of cross-linked silicon compounds with linear, non-cross-linked silicone compounds in dissolved or dispersed form.

The mixing ratio of silicone resins to silicone oils or silanes can be varied, depending upon the desired degree of flexibility. Preferably, there are used mixtures of methyl, phenyl or methyl-phenyl silicone resins with methyl, phenyl or methyl-phenyl silicone oils or methyl or phenyl silanes. The silicone resins and silicone oils or silanes are preferably used in dissolved or dispersed form.

The process according to the present invention can also be used for the impregnation of mixtures of glass fibre materials and organic fibre materials, preferably of flat bodies made from these fibre materials.

The process according to the present invention has the advantage that the desired flexibility of the coating can be reproducibly adjusted.

The following Examples are given for the purpose of illustrating the present invention:—

Example 1.

A mixed fabric of glass silk and polyacrylonitrile fibres is impregnated on a Foulard with a bath which contains the following components:

2.5% by weight of a 60% by weight dispersion of polytetrafluoroethylene
17.5% by weight of a 15% by weight emulsion of a cross-linked methyl-phenyl-silicone resin
6.0% by weight of a 20% by weight graphite dispersion

The squeezing off effect is 80% by weight. After drying at 80°C., fixing is carried out for 4 minutes at 140°C.

Example 2.

A glass silk fabric is impregnated on a Foulard with a bath which contains the following components:

5.0% by weight of a 60% by weight dispersion of polytetrafluoroethylene
8.0% by weight of a 20% by weight graphite dispersion
5.0% by weight of a 12.5% by weight emulsion of methyl-phenyl-silicone
5.0% by weight of a 7.5% by weight emulsion of cross-linked methyl-phenyl-silicone resin.

The squeezing off effect is 35% by weight. After drying at 80-90°C., fixing is carried out for 30 seconds at 250°C.

The fabrics impregnated in the manner described in Examples 1 and 2 are particularly suitable for use as filter materials for the removal of dust from hot gases.

Besides glass fibre materials, the process according to the present invention can also be applied to other inorganic fibre materials, for example, mineral, asbestos or ceramic fibre materials.

WHAT WE CLAIM IS:—

1. A process for the impregnation of inorganic fibre materials, such as glass fibre materials, with a composition containing silicone resins and fluoropolymers and optionally of graphite and/or molybdenum disulphide or with a composition containing silicone resins and graphite and/or molbdenum disulphide or with a composition containing silicone resins and or molybdenum disulphide, which compositions are fixed at an elevated temperature, wherein, as silicone resins, there are used mixtures of cross-linked silicon compounds with linear non-cross-linked silicone compounds in dissolved or dispersed form.

2. A process according to claim 1, wherein, as cross-linked silicone compounds, there are used methyl, phenyl or methyl-phenyl silicone resins.

3. A process according to claim 1 or 2, wherein, as linear non-cross-linked silicone compounds, there are used methyl, phenyl or methyl-phenyl-silicone oils or methyl- or phenyl-silanes.

4. A process according to any of the preceding claims, wherein the mixing ratio of silicone resins to silicone oils is adjusted depending upon the desired flexibility of the impregnated fibre materials.

5. A process according to any of the preceding claims, wherein the glass fibre materials are mixed with organic fibre materials.

6. A process according to claim 1 for the impregnation of inorganic materials, substantially as hereinbefore described and exemplified.

7. Inorganic fibre materials, whenever impregnated by the process according to any of claims 1 to 6.

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